Exam 1 Answer Key

Short Answer
1. Describe two potential problems with Maslow’s hierarchy of needs. (2 pts.)
   a. Exceptions to the order (e.g., martyrs sacrifice life itself for an ideal).
   b. A given motive does not need to be 100% satisfied before we turn to a higher need.
   c. The means of satisfying a particular need vary across cultures (e.g., being a doctor may be respected in some cultures, while being a farmer or hunter may be more respected in other cultures).
   d. No particular behavior is motivated by a single need – behavior is a result of multiple motivations.

2. What is the typical ordering of the stages of sleep? Why might REM sleep sometimes be referred to as paradoxical sleep? (3 pts.)

People cycle through sleep in the following way: Stage1 → Stage 2 → Stage 3 → Stage 4 → Stage 3 → Stage 2 → Stage 1 → REM → Stage 1, etc….

REM is called paradoxical sleep because EEG waves show large amounts of activity in the brain even though the individual is asleep.

Essay
1. The process of neural communication is responsible for all behaviors exhibited by humans and animals. Discuss this important electro-chemical process. Include in your answer: (1) the components of a typical neuron, (2) the order of transmission of information within a neuron, and (3) the process of neural communication between two neurons. Finally, provide a real-world example of a disorder that occurs because of a breakdown of one or more of the components of neural communication.

1 and 2: Dendrites (receive information from neighboring neurons) → Cell Body (life support center) → Axon Hillock (generates Action Potential) → Axon (contains Myelin Sheath and Nodes of Ranvier to speed neural transmission) → Terminal Buttons (contain synaptic vesicles and neurotransmitter).

3: Action potential triggers synaptic vesicles to fuse with presynaptic membrane in terminal buttons. Neurotransmitters are spilled from synaptic vesicles into the synapse where the chemical travels across the synapse and potentially fuses with receptor cells on the postsynaptic membrane. Postsynaptic membrane (on dendrite of neighboring neuron) takes up neurotransmitter and triggers a new action potential to start.

Real-world example:
Multiple Sclerosis: break-down of myelin sheath on axon causes transmission to slow and eventually stop.

Parkinson’s Disease: lack of dopamine in synapse causes movement problems, etc…
Short Answer

1. Describe two different processes used by people to interpret depth in their visual environment. (3 pts.)

Binocular disparity allows one to sense depth and distance because of the different angular positions (each eye has a slightly different view). Most processes come from the monocular cues. These include: interposition (one object in front of another), relative size and linear perspective (objects in the distance appear smaller), motion parallax (movement of object in relation to environment), texture gradients (change and shift in the surface texture of ground).

2. Lisa conducts a study in which she gives one group of participants three cups of coffee, another group of participants five cups of coffee, and a third group no coffee. She then measures all three groups in a memory test. What are the independent and dependent variables in her study? (2 pts.)

The independent variable is the number of cups of coffee that the participants drank. The dependent variable is the participants’ performance on the memory test.

Essay

1. Research on visual search has taught us much about how attention can influence perception. In your answer, describe pre-attentive and attentive processes at work in visual search tasks. Describe the basic results from visual search studies (i.e., results from feature and conjunction search). Describe Treisman’s feature integration theory (FIT). What are free-floating features and illusory conjunctions? Does Triesman's theory account for this phenomenon? If so, how?

Feature searches are pre-attentive. The searched for object pops out, regardless of how many other things are in the field (“O” is easy to find no matter how many “V”s surround it). However, if it is a conjunction search (find a red “O” among blue “O”s and red and blue “V”s) than it takes longer because attention must be paid to the different traits. It is an attentive task to combine shape and color in the search. Feature Integration Theory says that there are free-floating features, such as shape, color, size, and movement, which are easily picked out. FIT also says that if they need to be combined, that requires attention, thus should take longer. This might explain why illusory conjunctions occur. Illusory conjunctions are when different features of a scene a mixed up, such as seeing a red “F” and green “X” when what was presented quickly was a red “X” and green “F”. This indicates it takes time to process the features together, which supports the FIT idea that there is a plane of attention needed to combine features. If there were no higher attention needed, there would probably not be illusory conjunctions, because features would not need integration. They would be interpreted or not. But this would require an even more complex, even infinitely complex brain organization to recognize any possible combination, which is not very possible.